PLASKOLITE

BUILDING CODES AND FLAMMABILITY

BACKGROUND

Plastic building materials in commercial and residential buildings, can at times, offer superior performance due to outstanding impact and strength, lightweight, electrical insulation, high thermal resistance and flame inhibiting characteristics. These materials can be found in walls, roof, ceiling, doors, attics, crawlspaces, interior signs, finish and trim work, light covers and other areas represented by traditional building materials. However, in the presence of an ignition source and given sufficient time and high temperatures, plastics will ultimately burn. Consequently, polycarbonate materials used in building construction frequently contain fire-inhibiting compounds to mitigate flame spread and smoke development.

There are numerous local, state and national building codes that have rules dealing with how and where plastic building materials may be used. These codes set limits for allowable flame spread and smoke development for interior walls, ceiling finishes and ceiling trim based on location and occupancy classification.

In 1994, a single set of comprehensive and coordinated national construction codes was established. Brief reviews of the requirements of plastic building products, found in commercial buildings, are outlined below:

THE INTERNATIONAL CODE COUNCIL (ICC)

The International Code Council (ICC) is dedicated to develop codes and standards used in the design, build and compliance processes to construct safe, sustainable, affordable and resilient structures. Most U.S. communities and many global markets have adopted the international codes.

Specifically, ICC codes are a set of comprehensive, coordinated, building safety and fire prevention codes. Building codes benefit public safety and support the industry’s need for a universal set of codes without local or regional limitations.

The fifty states and the District of Columbia have adopted ICC codes. Federal agencies including the Architect of the Capitol (AOC), General Services Administration (GSA), National Park Service (NPS), Department of State (DoS), U.S. Forest Service (USFS) and the Veterans Administration (VA) adhere to and enforce ICC Codes.

The Department of Defense (DoD) references the International Building Code for constructing military facilities, including those that house U.S. troops at home and abroad.

Source: About ICC

THE INTERNATIONAL BUILDING CODE (IBC)

The International Building Code (IBC) is developed by the International Code Council (ICC). The building code has no legal status until it is adopted or adapted by government regulation. The IBC provides minimum standards for building construction to ensure the public health, safety and welfare.

The IBC was developed to consolidate existing building codes into one national and international uniform code. It is used to regulate building construction through the use of standards and is a reference for architects and engineers when designing structures or building systems.

Chapters in the IBC dealing with plastics include: Chapter (8) Interior Finishes, (24) Glass and Glazing and (26) Plastic.
Chapter 8 (Interior finishes)
Provisions of this chapter govern the use of materials used as interior finishes, trim and decorative materials as they relate to fire performance and smoke development.

Chapter 24:
Provisions of this chapter govern plastic glazing that shall meet the weathering requirements of ANSI Z97.1

Chapter 26: (Exterior finishes)
These provisions govern the materials, application, construction, design and installation of foam plastic, foam plastic insulation, plastic veneer, interior plastic finish and trim and light-transmitting plastics.

ICC EVALUATION SERVICE (ICC-ES)
The ICC Evaluation Service (ICC-ES) is a nonprofit company that conducts technical evaluations of building products, components, methods, and materials. Evaluation reports from ICC Evaluation Service are used as a resource by code officials to verify building products comply with code requirements.

Plaskolite tested TUFFAK® products under ASTM E84 and report results can be found here: ICC-ES Report-2728 ICC-ES Report ESR-2728.pdf
Information on how to read and interpret an ICC-ES report: ICC-ES Evaluation Reports

TYPICAL INDOOR RATINGS - Flammability & Class Ratings

Flame spread and smoke development for products tested in accordance with NFPA 286: Standard Methods of Fire tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

TUFFAK CA and TUFFAK CA-AR sheets comply with the requirements for wall finishes (between 0.118” – 0.236”) and ceiling finished (between 0.118” – 0.500”) as listed in IBC Section 803 when installed in accordance with the manufacturer’s recommendations. Therefore, these sheets comply with the requirements under CLASS A for interior finishes.

TUFFAK GP sheets with a uniform thickness of 0.030” exhibits a flame spread of less than 25 and a smoke development index of 450 or less when tested in accordance with ASTM E84. Therefore, these sheets comply with the requirements for CLASS A interior finishes per IBC Section 803.1. TUFFAK GP sheets with a uniform thickness of 0.030” but less than or equal to 0.060” thick exhibit a flame spread of less than 75 and a smoke development index of 450 or less when tested in accordance with ASTM E84. Therefore, these sheets comply with the requirements for CLASS B interior finishes per IBC Section 803.1.

The International Building Code (IBC) Report has established three classifications to their rating system:

Class A (also referred to as Class 1) : ≤25 Flame Spread Index (FSI)

Class B (Class 2) : ≤75 Flame Spread (FSI)

Class C (Class 3) : ≤200 Flame Spread (FSI)

All classes list a Smoke Developed Index (SDI) of ≤450

The calculated Flame Spread Index is a relative indication of flammability for the test material with respect to a red oak standard. The rate and distance the flame spread travels are considered part of the flame spread index. A reported flame spread index of “25” indicates a material has approximately 25 percent of the red oak standard’s flame spread characteristics. The “smoke developed index” is calculated similarly.

TYPICAL OUTDOOR RATINGS - Flammability & Class Ratings
TUFFAK CA-UV sheets with a maximum thickness of 0.375” complies with the NFPA 286 fire test requirements listed in 2021 and 2018 IBC Section 3105.3 for exterior canopies.

The ICC-ES Report lists two combustibility classifications in their rating system for outdoor structures attached to buildings (e.g. canopies, awning, patio covers, skylights and similar structures):

Class CC1: Plastic materials that have a burning extent of 1 inch (25 mm) or less, when tested at a nominal thickness of 0.060 inch (1.5 mm), or in the thickness intended for use, in accordance with ASTM D 635 and the next lesser rating is Class CC2.

Class CC2: Plastic materials that have a burning rate of 2.5 inches per minute (1.06 mm/s) or less, when tested at a nominal thickness of 0.060 inch (1.5 mm), or in the thickness intended for use, in accordance with ASTM D 635.

[ASTM D 635 - A flammability test used to determine the relative burn rate of self-supporting plastics. This reports a rate of burning and/or extent and time of burning of self-supporting plastics in a horizontal position.]

TUFFAK PRODUCT RATING ACCORDING TO ICC-ES

<table>
<thead>
<tr>
<th>TABLE 1—TUFFAK® PROPERTIES</th>
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</thead>
<tbody>
<tr>
<td><strong>PARAMETER</strong></td>
</tr>
<tr>
<td>Thickness (inch)</td>
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<tr>
<td>&lt;0.060</td>
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<tr>
<td>Plastic classification (IBC Section 2005.4)</td>
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For 1 inch = 25.4 mm.

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<thead>
<tr>
<th>TABLE 2—TUFFAK® PROPERTIES (ONE SIDE PRISMATIC)</th>
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<tbody>
<tr>
<td><strong>PARAMETER</strong></td>
</tr>
<tr>
<td>Thinnest Thickness (inch)</td>
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<tr>
<td>0.053 to 0.435</td>
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<tr>
<td>Overall Thickness (inch)</td>
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<td>Plastic classification (IBC Section 2005.4)</td>
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For 1 inch = 25.4 mm.

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<tr>
<th>TABLE 3—HYGARD® PROPERTIES</th>
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<tr>
<td><strong>PARAMETER</strong></td>
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<tr>
<td>Thickness (inch)</td>
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<tr>
<td>0.375</td>
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<tr>
<td>Plastic classification (IBC Section 2005.4)</td>
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</tbody>
</table>

For 1 inch = 25.4 mm.

DISCLAIMER:

These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use are beyond our control. We recommend that the prospective user determine the suitability of our materials and suggestions before adopting them on a commercial scale.